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Spin and parities of 19Ne states of astrophysical interest[1] FEDERICO PORTILLO CHAVES, North Carolina State University, KIANA SETOODEHNIA, European X-ray Free Electron Laser GmbH, Schenefeld, Germany, CALEB MARSHALL, RICHARD LONGLAND, North Carolina State University — Observations of classical nova ejecta show discrepancies with theoretical predictions, particularly for the quantity of material ejected by the explosion. This discrepancy could be resolved with the detection of γ rays originating from ^{18}F. However, theoretical predictions of the flux of these γ rays are limited by large uncertainties in the ^{18}F destruction rates. These uncertainties are caused mainly by the incomplete knowledge of the influence of low energy resonances on the cross section for the main ^{18}F destruction reaction ^{18}F(p,α)^{15}O. In this work we searched for states in the compound nucleus (^{19}Ne) relevant at nova temperatures and determined their spin and parities (J^π) when possible. In particular, we found that the state at 6.130 MeV (a proton sub-threshold resonance at E_{CM}=-280 keV) has a $J^\pi=3/2^+$, which opens the possibility for interference in the cross section with the well known broad resonances at E_{CM} = 332 keV and 665 keV. We will present our experimental results and will highlight their effect on the ^{18}F(p,α)^{15}O reaction rate.

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Federico Portillo Chaves
North Carolina State University

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